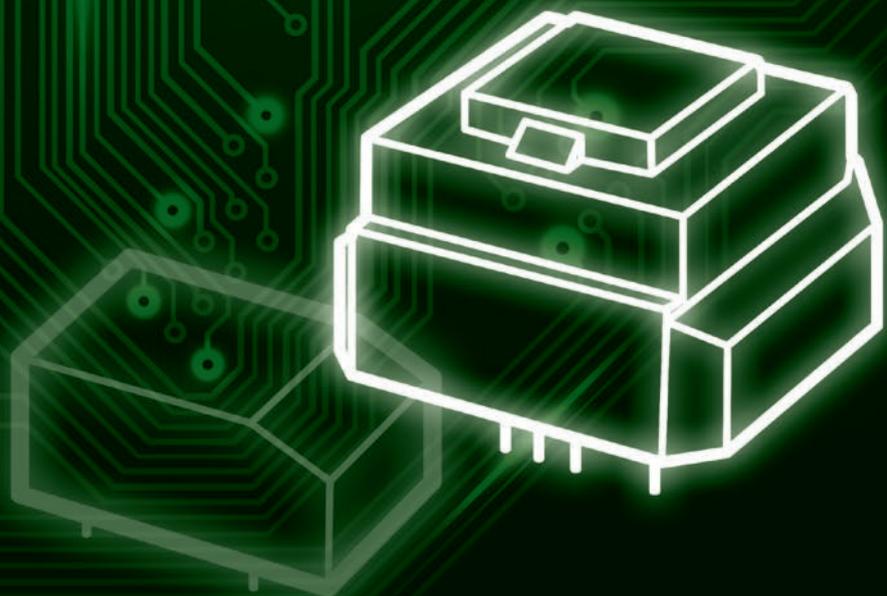


ELECTRONICS COMPONENTS

POWER SUPPLY MODULE



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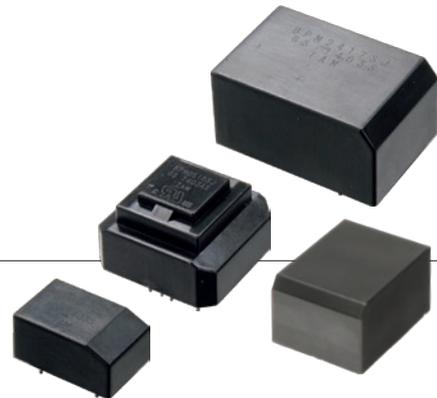
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Five Improvements by Power Supply Modules

S tand-by Power

N oise Reduction

A vailability



C ompact Form-Factor

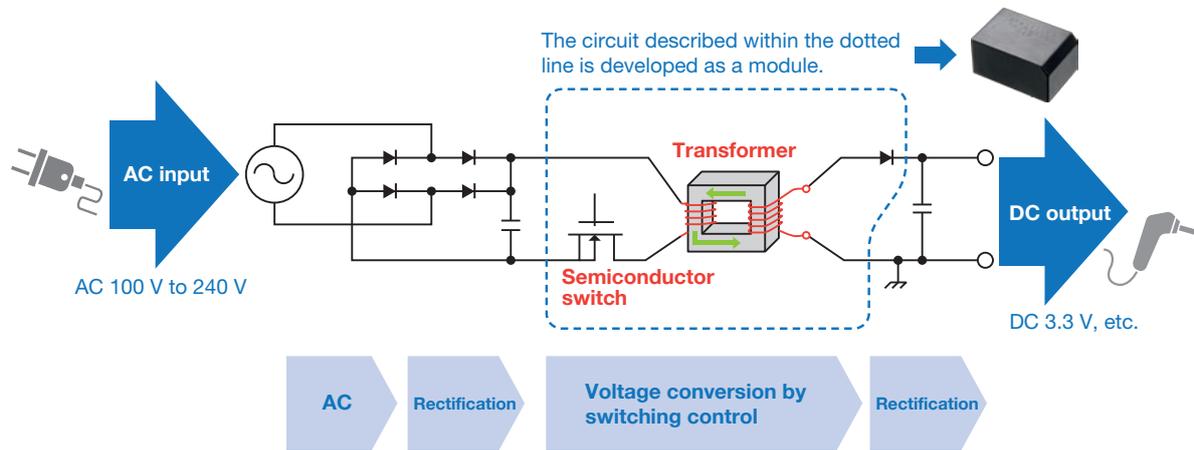
F acilitates Circuit Design

Switching power supply and power supply modules

Currently, a switching power supply is widely used to convert commercial AC power supplied to general households (AC 100 V in Japan) into DC power.

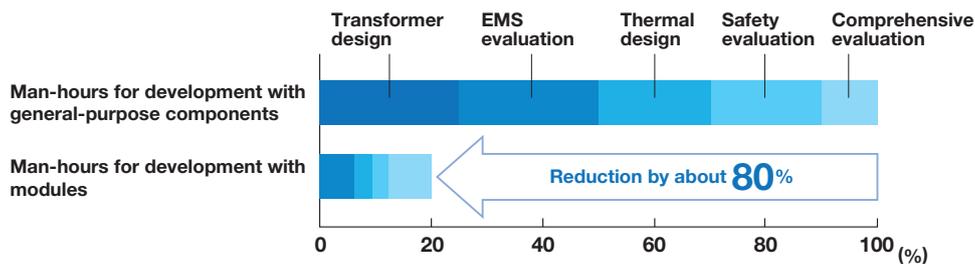
A switching power supply converts voltage by rapidly flipping a semiconductor switch on and off (about 100,000 times per second). As for its features, it offers high conversion efficiency and allows size and weight reduction. It is used in AC adapters for cellphones, smartphones, notebook PCs, etc.

Tamura has developed power modules that function as circuits of switching power supply, as described in “Voltage conversion by switching control” within the dotted line in the figure below. The integration of key devices—transformers, control circuits, and semiconductor switches—into a single package allows easy design of power supplies with a small number of components.



Significant reduction in man-hours for design and evaluation!

You can greatly simplify very important processes in power supply development—transformer design, thermal design, safety standard compliance, open and short circuit testing, and EMS evaluation. It is possible to reduce development man-hours required before mass production of power supplies by about 80%, thereby reducing development cost and time.

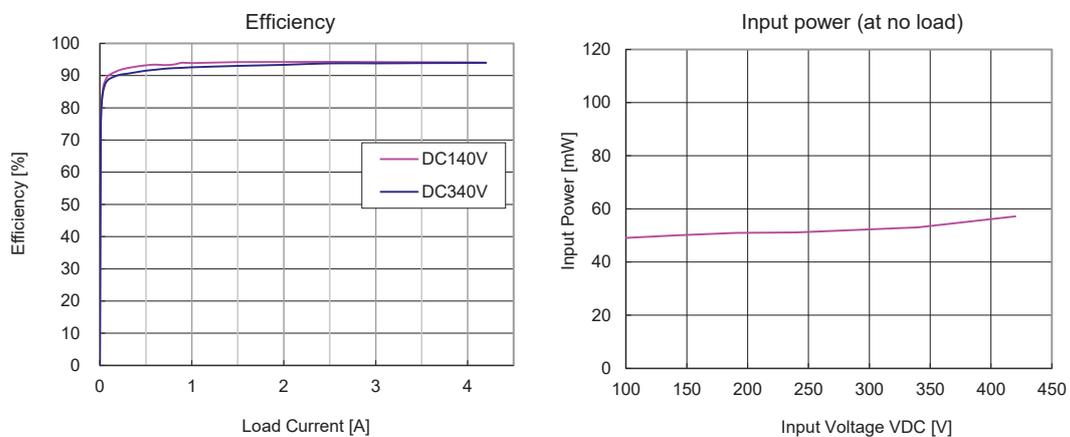


Features of power supply modules

Easy design of power supplies with high efficiency and low standby power consumption!

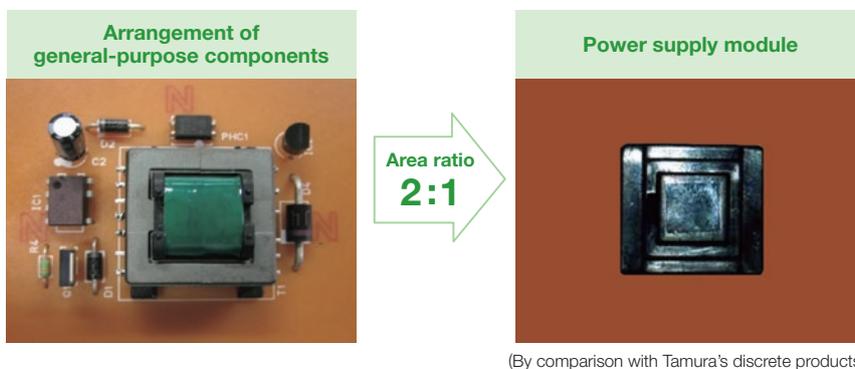
Tamura's power supply modules employ circuit technologies that incorporate know-how of original technologies Tamura has developed to achieve low standby power consumption and high efficiency. This facilitates the design of high-performance power supplies that can significantly reduce standby power consumption under no load and maintain high efficiency across the entire load range from low load to rated load.

Typical characteristics (example : RPM2433SJ)



Reduction in mounting area

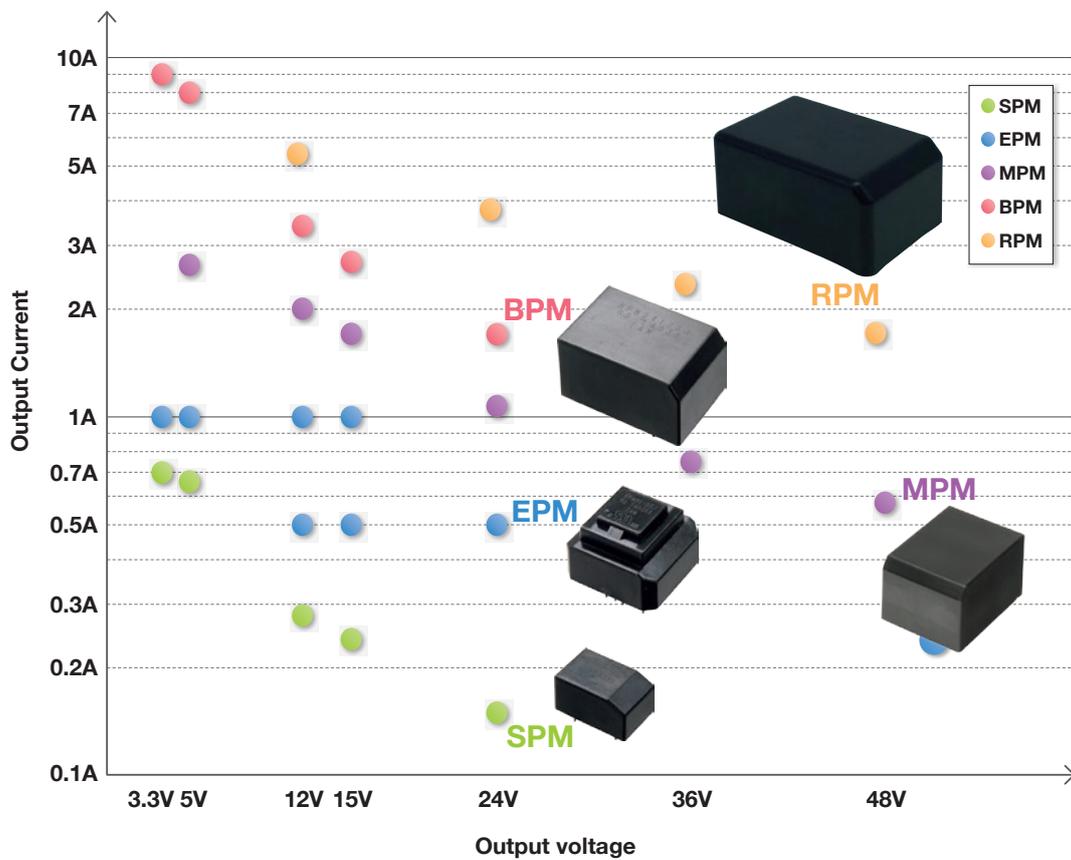
As the key components are housed in the modules, mounting area can be reduced to about half of that for an arrangement of general-purpose components.



Explanation of the Outline

With our original circuit technology, Tamura's power supply modules has the capability of design resource reduction, ultra-low standby power consumption and high efficiency. And also have made it possible to have low standby power & high efficiency at low power external components. Will contribute design time and development cost reduction.

Output Current / Output voltage



Product Lineup

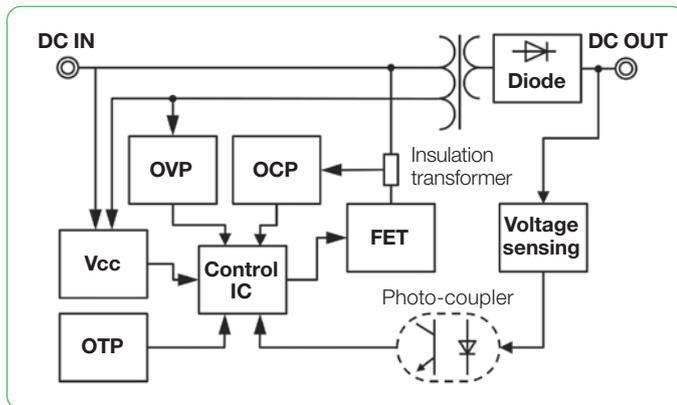
Series	SPM Series	EPM Series	MPM Series	BPM Series	RPM Series
Class	4W	15W	25W	40W	80W
Product					

Explanation of the Outline

Outline

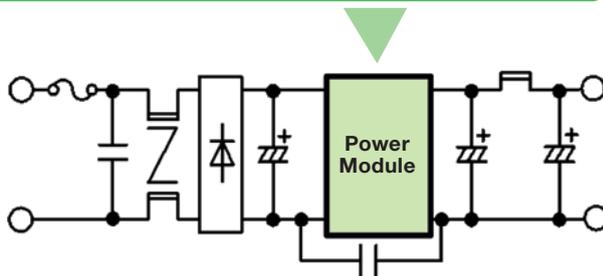
Tamura's power supply modules are energy-saving switching power supply modules with switching transformer, IC control, circuit control and a built-in (FET) switching component.

By attaching an external input noise filter, input rectifier diode, input / output smoothing capacitor a high-efficiency and high performance switching power supply with low standby power can easily be created with the Power supply module.



Internal parts and functions

- Insulation Transformer
- FET
- IC control
- Output rectifier diode
- Photo-coupler
- Output voltage detection circuit
- Primary side control circuit
- Over voltage protection
- Over current protection
- Heating protection circuit



Switching Power Supply can be easily created

Applications

Industrial equipment, Information processing equipment, AV equipment, Consumer electronics, Standby power, Small power, etc.

Features

- Capable of high efficiency from quasi resonant operation
- Low standby power consumption because of the combination of behavior and burst frequency reduction
- Corresponding world wide input and PFC output voltage
- Reinforced insulation between primary and secondary
- Capable of low noise for Tamura's unique structure
- Correspondence of various safety standard (Information equipment, AV equipment, Industrial equipment, Home appliance)
- Various built-in protection function (Over-current protection, Over-voltage protection, Overheat protection)

Product List , SPM Series

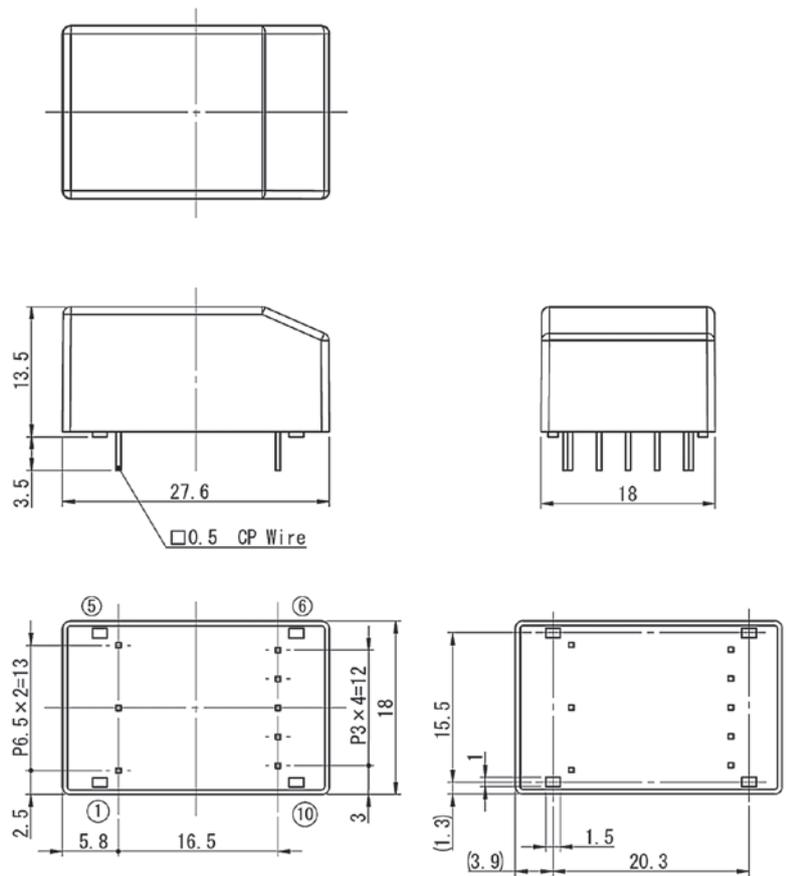
SPM Series



Item	Model			
	SPM0307SZ	SPM0507SZ	SPM1203SZ	SPM1502SZ
Rated Output Voltage / Rated Load	3.3V / 0.70A	5V / 0.66A	12V / 0.28A	15V / 0.22A
Output voltage tolerance (0 to 10% Load)	+15% / -10%	+12% / -10%	±10%	±10%
Output voltage tolerance (10 to 100% Load)	±10%	±7.5%	±6%	+5% / -6%
Input Voltage Range	DC110 - 374V			
Efficiency (DC140V, Rated load, 25°C)	70%(typ)	77%(typ)	81%(typ)	82%(typ)
No-load power (DC140V, 25°C)	50mW(typ)			
Ripple	150mVp-p	150mVp-p	250mVp-p	400mVp-p
Ripple & Noise	200mVp-p	200mVp-p	300mVp-p	500mVp-p
Protection	Over Current Protection	Auto recovery		
	Over Temperature Protection	Auto recovery		
Insulation	Insulation Voltage	AC3000V 1min Cut off current = 2mA		
	Insulation Resistance	DC500V 100MΩmin		
Environment	Ambient Temperature (Operating)	-20 to +95°C (+75 to +95°C : stand for derating)		
	Ambient Humidity (Operating)	20 to 95%RH (Nil condensation)		
	Ambient Temperature (Storage)	-25 to +100°C		
	Ambient Humidity (Storage)	20 to 95%RH (Nil condensation)		
	Vibration	10 to 55Hz 1.5mmp-p 120min X,Y,Z direction each once		
	Shock	490m/s ² 11ms X,Y,Z direction each once		

External Dimensions / Pin assignment

External Dimensions



Note: The dimensional tolerance without directions is $\pm 0.5\text{mm}$.

Pin assignment

Primary side			Secondary side		
Pin No.	Name	Description	Pin No.	Name	Description
1	Vin(+)	Input (+)	6	N.C.	N.C.(Unable to connect to other circuits.)
2	-	No pin	7	N.C.	N.C.(Unable to connect to other circuits.)
3	Drain	Noise adjustment	8	W1	Secondary winding terminal
4	-	No pin	9	Vo	Output (+)
5	Vin(-)	Input (-)	10	GND	Output (-)

Product List , EPM Series

EPM Series

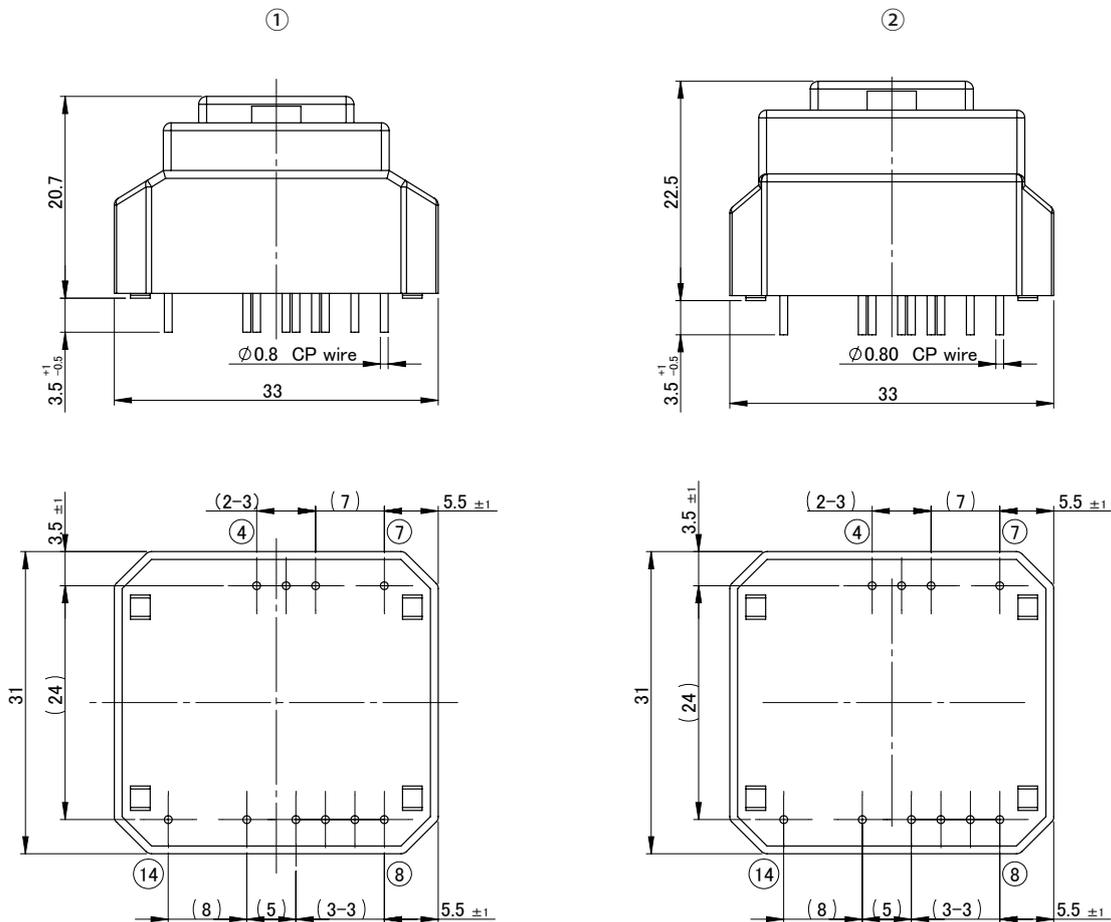


RoHS

Item	Model						
	EPM0310SJ	EPM0510SJ	EPM1205SJ	EPM1210SJ	EPM1505SJ	EPM1510SJ	EPM2405SJ
External dimensions	①	①	①	②	①	②	②
Rated Output Voltage / Rated Load	3.3V / 1.0A	5V / 1.0A	12V / 0.5A	12V / 1.0A	15V / 0.5A	15V / 1.0A	24V / 0.5A
Output voltage tolerance	±5%						
Input Voltage Range	DC110 - 450V						
Efficiency (DC140V, Rated load, 25°C)	78%(typ)	80%(typ)	85%(typ)	88%(typ)	88%(typ)	90%(typ)	90%(typ)
No-load power (DC140V, 25°C)	15mW(typ)	17mW(typ)	19mW(typ)	23mW(typ)	25mW(typ)	23mW(typ)	28mW(typ)
Ripple	60mVp-p	60mVp-p	120mVp-p	120mVp-p	150mVp-p	150mVp-p	240mVp-p
Ripple & Noise	100mVp-p	100mVp-p	150mVp-p	150mVp-p	200mVp-p	200mVp-p	300mVp-p
Protection	Over Current Protection	Auto recovery					
	Over Voltage Protection	Lutch off					
	Over Temperature Protection	Lutch off					
Insulation	Insulation Voltage	AC3750V 1min Cut off current = 2mA					
	Insulation Resistance	DC500V 100MΩmin					
Environment	Ambient Temperature (Operating)	-20 to +80°C (+60 to +80°C : stand for derating)					
	Ambient Humidity (Operating)	20 to 95%RH (Nil condensation)					
	Ambient Temperature (Storage)	-25 to +85°C					
	Ambient Humidity (Storage)	5 to 95%RH (Nil condensation)					
	Vibration	10 to 55Hz 1.5mmp-p 120min X,Y,Z direction each once					
	Shock	490m/s ² 11ms X,Y,Z direction each once					

External Dimensions / Pin assignment

External Dimensions



Note: The dimensional tolerance without directions is ± 0.5 mm.

Pin assignment

Primary side			Secondary side		
Pin No.	Name	Description	Pin No.	Name	Description
8	N.C.	N.C.(Unable to connect to other circuits.)	1	-	No pin
9	VccW	Control pin	2	-	No pin
10	Vin(-)	Input (-)	3	-	No pin
11	Vcc	Start-up time adjustment	4	SecW	Secondary winding terminal
12	Vin(+)	Input (+)	5	Vo	Output (+)
13	-	No pin	6	N.C.	N.C.(Unable to connect to other circuits.)
14	Drain	Noise adjustment	7	GND	Output (-)

Product List , MPM Series

MPM Series



RoHS

Item	Model					
	MPM0527SJ	MPM1220SJ	MPM1517SJ	MPM2411SJ	MPM3608SJ	MPM4806SJ
Rated Output Voltage / Rated Load	5.0V / 2.7A	12V / 2.0A	15V / 1.7A	24V / 1.1A	36V / 0.75A	48V / 0.58A
Output voltage tolerance	±5%					
Input Voltage Range	DC100 to 420V					
Efficiency (DC140V, Rated load, 25°C)	82%(typ)	86%(typ)	86%(typ)	89%(typ)	90%(typ)	90%(typ)
No-load power (DC140V, 25°C)	25mW(typ)	30mW(typ)	29mW(typ)	30mW(typ)	38mW(typ)	45mW(typ)
Ripple	60mVp-p	120mVp-p	150mVp-p	240mVp-p	360mVp-p	480mVp-p
Ripple & Noise	100mVp-p	150mVp-p	180mVp-p	300mVp-p	400mVp-p	570mVp-p
Protection	Over Current Protection	Auto recovery				
	Over Voltage Protection	Lutch off				
	Over Temperature Protection	Lutch off				
Insulation	Insulation Voltage	AC3750V 1min Cut off current = 2mA				
	Insulation Resistance	DC500V 100MΩmin				
Environment	Ambient Temperature (Operating)	-20 to +80°C (+50 to +80°C: stand for derating)				
	Ambient Humidity (Operating)	20 to 95% RH (Nil condensation)				
	Ambient Temperature (Storage)	-25 to +85°C				
	Ambient Humidity (Storage)	5 to 95% RH (Nil condensation)				
	Vibration	10 to 55Hz 1.5mmp-p 120min X,Y,Z direction each once				
	Shock	490m/s ² 11ms X,Y,Z direction each once				

Product List , BPM Series

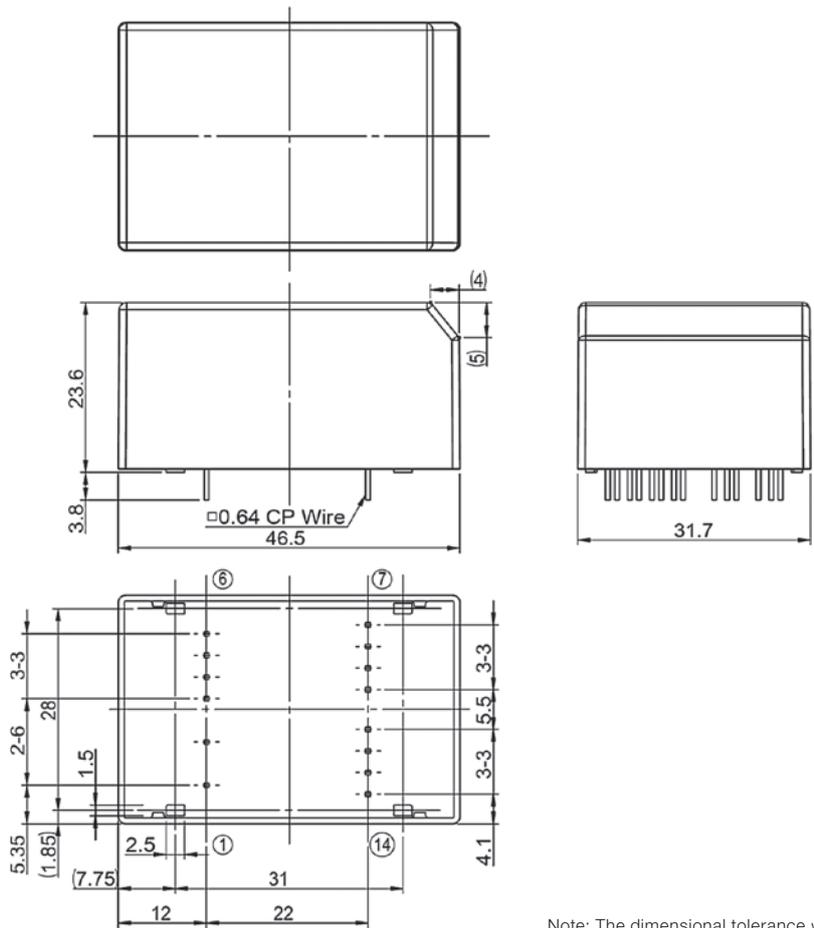
BPM Series



Item	Model			
	BPM0580SJ	BPM1234SJ	BPM1527SJ	BPM2417SJ
Rated Output Voltage / Rated Load	5V / 8.0A	12V / 3.4A	15V / 2.7A	24V / 1.7A
Output voltage tolerance	±5%			
Input Voltage Range	DC100 to 420V			
Efficiency (DC140V, Rated load, 25°C)	87%(typ)	91%(typ)	93%(typ)	90%(typ)
No-load power (DC140V, 25°C)	25mW(typ)	25mW(typ)	25mW(typ)	25mW(typ)
Ripple	60mVp-p	120mVp-p	120mVp-p	240mVp-p
Ripple & Noise	100mVp-p	150mVp-p	150mVp-p	300mVp-p
Protection	Over Current Protection	Auto recovery		
	Over Voltage Protection	Lutch off		
	Over Temperature Protection	Lutch off		
Insulation	Insulation Voltage	AC3000V 1min Cut off current = 2mA	AC3750V 1min Cut off current = 2mA	
	Insulation Resistance	DC500V 100MΩmin		
Environment	Ambient Temperature (Operating)	-20 to +80°C (+50 to +80°C : stand for derating)		
	Ambient Humidity (Operating)	20 to 95%RH (Nil condensation)		
	Ambient Temperature (Storage)	-25 to +85°C		
	Ambient Humidity (Storage)	5 to 95%RH (Nil condensation)		
	Vibration	10 to 55Hz 1.5mmp-p 120min X,Y,Z direction each once		
	Shock	490m/s ² 11ms X,Y,Z direction each once		

External Dimensions / Pin assignment

External Dimensions



Note: The dimensional tolerance without directions is ± 0.5mm.

Pin assignment

Primary side			Secondary side		
Pin No.	Name	Description	Pin No.	Name	Description
1	Vin(+)	Input (+)	7	REF	Output voltage adjustment
2	Drain	Noise adjustment	8	RC(-)	Output voltage detection (-)
3	Vin(-)	Input (-)	9	GND	Output (-)
4	Vcc	Start-up time adjustment	10	GND	Output (-)
5	VccW	Control pin	11	GND	Output (-)
6	N.C.	N.C.(Unable to connect to other circuits.)	12	Vo	Output (+)
			13	Vo	Output (+)
			14	RC(+)	Output voltage detection (+)

Product List , RPM Series

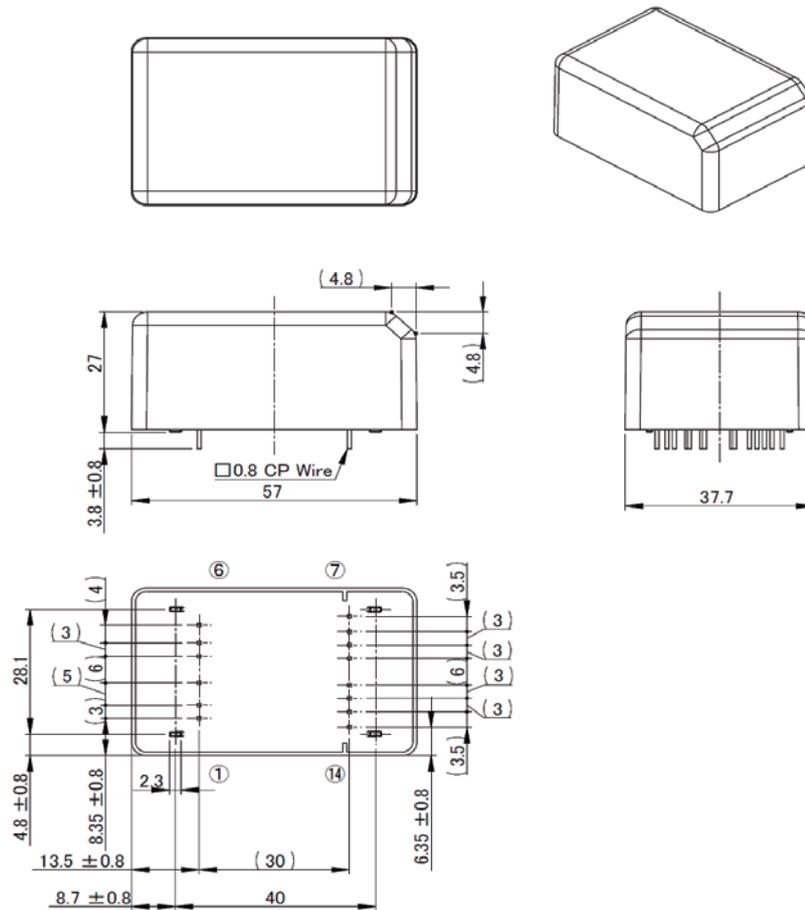
RPM Series



Item	Model			
	BPM0580SJ	BPM1234SJ	BPM1527SJ	BPM2417SJ
Rated output voltage	12V	24V	36V	48V
Rated output current / Peak current	5.5A / 7.0A	3.3A / 4.2A	2.2A / 2.8A	1.65A / 2.1A
Output voltage tolerance	±5%			
Input voltage range	DC100 to 420V			
Efficiency (DC140V, Rated load, 25°C)	90%(typ)	92%(typ)	93%(typ)	94%(typ)
Standby power (DC140V, 25°C)	50mW(typ)	60mW(typ)	90mW(typ)	120mW(typ)
Ripple	120mVp-p	240mVp-p	360mVp-p	480mVp-p
Ripple & Noise	200mVp-p	300mVp-p	450mVp-p	600mVp-p
Protection	Overcurrent protection	Auto recovery		
	Overvoltage protection	Latch off		
	Over Temperature Protection	Latch off		
Insulation	Insulation Voltage	AC3000V 1min Cut off current = 3mA		
	Insulation resistance	DC500V 100MΩ or more		
Environmental conditions	Operating temperature	-20 to +80°C (+50 to +80°C : stand for derating)		
	Operating humidity	20 to 95%RH (Nil condensation)		
	Storage temperature	-25 to +85°C		
	Storage humidity (5 to 95%RH (Nil condensation)		
	Vibration	10 to 55Hz 1.5mmp-p 120min X,Y,Z direction each once		
	Shock	490m/s ² 11ms X,Y,Z direction each once		

External Dimensions / Pin assignment

External Dimensions



Note: The dimensional tolerance without directions is $\pm 0.5\text{mm}$.

Pin assignment

Primary side			Secondary side		
Pin No.	Name	Description	Pin No.	Name	Description
1	Vin(+)	Input (+)	7	RC(-)	Output voltage detection (+)
2	Vin(+)	Input (+)	8	REF	Output voltage adjustment
3	Drain	Noise adjustment	9	GND	Output (-)
4	Vin(-)	Input (-)	10	GND	Output (-)
5	Vin(-)	Input (-)	11	Vo	Output (+)
6	N.C.	N.C.(Unable to connect to other circuits.)	12	Vo	Output (+)
			13	Vo	Output (+)
			14	RC(+)	Output voltage detection (-)

Important notice

- The content of this manual is subject to change without prior notice for the purpose of improvements, etc. Ensure that you are in possession of the most up-to-date information when using this product.
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 - Use that involves exposure to direct sunlight, outdoor exposure, or dusty conditions
 - Use in locations where corrosive gases such as salt air, C12, H2S, NH3, SO2, or NO2, are present
 - Use in environments with strong static electricity or electromagnetic radiation
 - Use that involves placing inflammable material next to the product
 - Use of this product either sealed with a resin filling or coated with resin
 - Use of water or a water soluble detergent for flux cleaning
 - Use in locations where condensation is liable to occur
- This product is not designed to resist radiation.
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